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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,768	09/17/2003	Craig S. Levin	0321.68297	4862

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EXAMINER

POLYZOS, FAYE S

ART UNIT PAPER NUMBER

2878

DATE MAILED: 07/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/664,768

Applicant(s)

LEVIN, CRAIG S.

Examiner

Faye Polyzos

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2, 6-7, 11-23 and 25-28 is/are rejected.
- 7) ☐ Claim(s) 3-5, 8-10 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/26/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 6-7, 11-16, 22-26 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by *Stettner et al* (US 5,099,128 A).

Regarding claim 1, *Stettner* discloses a radiation imaging device, comprising: a subject radiation station producing photon emissions (nuclear source) (3); and a scintillation crystal detection array arranged to receive emissions from the subject radiation station, the scintillator crystal detection array having a plurality of crystal sheets (15) and intervening semiconductor photodetector positional detectors ((11), the semiconductor photodetector positional detectors (11) having semiconductor photodetectors reading light from a large face of a corresponding crystal sheet (15) (See Generally Figs. 1b, 3a-3b, 4a and col. 1, lines 51-57 and col. 3, lines 55-68).

Regarding claim 2, *Stettner* discloses the scintillation crystal detection array arranged to receive the emissions in a direction generally orthogonal to large faces of crystal sheets (See Generally Figs. 3a-3b, 4a and col. 1, lines 51-57 and col. 3, lines 55-68).

Regarding claim 6, Stettner discloses the intervening semiconductor photodetector positional detector (11) each comprises a position sensitive photodetector (col. 3, lines 44-51).

Regarding claim 7, Stettner discloses the scintillation crystal detection array is arranged to receive the emissions by end faces of the crystal sheets (15) in a direction generally parallel to large faces of the crystal sheets (Generally Figs. 3a-3b, 4a and 5a-5b).

Regarding claim 11, Stettner discloses the intervening semiconductor photodetector positional detector (11) each comprises a position sensitive photodetector (col. 3, lines 44-51).

Regarding claim 12, Stettner discloses the intervening semiconductor photodetector positional detectors (11) have a thickness of about less than or equal to 300 μm (col. 4, lines 19-28).

Regarding claim 13, Stettner discloses the intervening semiconductor photodetector positional detectors (11) comprise semiconductor photodetectors supported by one of the plurality of crystal sheets, the crystal sheets forming a substrate (See Generally Figs. 3a and 4a).

Regarding claim 14, Stettner discloses the intervening semiconductor photodetector (11) are each supported by a substrate (See Generally Figs. 3a and 4a).

Regarding claim 15, Stettner discloses the intervening semiconductor photodetector positional detectors (11) comprise semiconductor photodetectors

supported by one of the plurality of crystal sheets, the crystal sheets forming a substrate (See Generally Figs. 3a and 4a).

Regarding claim 16, Stettner discloses the intervening semiconductor photodetector (11) are each supported by a substrate (See Generally Figs. 3a and 4a).

Regarding claim 22, Stettner discloses a radiation image device, comprising: scintillation crystal sheets (15) arranged in parallel to each other; semiconductor photodetector positional detectors reading light from large faces of scintillation crystal sheets to detect interactions in the scintillation crystal sheet and independently provide position information concerning the interactions relative to at least one axis (See Generally Figs. 1b, 3a-3b, 4a and col. 1, lines 51-57 and col. 3, lines 55-68).

Regarding claim 23, Stettner discloses the intervening semiconductor photodetector positional detectors (11) have a thickness of about less than or equal to 300 μm (col. 4, lines 19-28).

Regarding claim 25, Stettner discloses the intervening semiconductor photodetector positional detectors (11) comprise semiconductor photodetectors supported by one of the plurality of crystal sheets, the crystal sheets forming a substrate (See Generally Figs. 3a and 4a).

Regarding claim 26, Stettner discloses the intervening semiconductor photodetector (11) are each supported by a substrate (See Generally Figs. 3a and 4a).

Regarding claim 28, Stettner discloses the semiconductor photodetector positional detectors are formed directly on corresponding large faces of the scintillation crystal sheets (See Generally Figs. 3a-3b and 4a).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Stettner et al* (US 5,099,128 A) as applied to claim 7 above, and further in view of Seidel et al ("Experimental Estimates of the Absolute Sensitivity of a Small Animal PET Scanner with Depth-of-Interaction Capability", Nuclear Science Symposium Conference Record, IEEE).

Regarding claim 17, *Stettner* discloses a radiation imaging device, comprising: a subject radiation station producing photon emissions (nuclear source) (3); and a scintillation crystal detection array arranged to receive emissions from the subject radiation station, the scintillator crystal detection array having a plurality of crystal sheets (15) and intervening semiconductor photodetector positional detectors ((11), the semiconductor photodetector positional detectors (11) having semiconductor photodetectors reading light from a large face of a corresponding crystal sheet (15) (See Generally Figs. 1b, 3a-3b, 4a and col. 1, lines 51-57 and col. 3, lines 55-68). *Stettner* does not disclose the crystal sheets and positional detectors arranged in a ring. *Seidel* discloses a plurality of crystal sheets and intervening semiconductor positional detectors arranged in a ring (See Fig. 1 and p. 21-57). *Seidel* teaches crystals arranged

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in a ring design provide for scanning of high sensitivity, high and uniform spatial resolution across a field-of-view and for moderate cost (p. 21-57, I. INTRODUCTION).

Therefore, it would have been obvious to modify the apparatus suggested by Stettner to allow for ring design arrangement, as suggested by Seidel, to allow for a more versatile apparatus.

5. Claims 18-21 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Stettner et al* (US 5,099,128 A) as applied to claim 1 above, and further in view of Tai et al ("Performance Evaluation of the MicroPET P4: a PET System Dedicated to Animal Imaging", Phys. Med. Biol., Vol. 46, No. 7, 2001).

Regarding claim 18, *Stettner* discloses a radiation imaging device, comprising: a subject radiation station producing photon emissions (nuclear source) (3); and a scintillation crystal detection array arranged to receive emissions from the subject radiation station, the scintillator crystal detection array having a plurality of crystal sheets (15) and intervening semiconductor photodetector positional detectors ((11), the semiconductor photodetector positional detectors (11) having semiconductor photodetectors reading light from a large face of a corresponding crystal sheet (15) (See Generally Figs. 1b, 3a-3b, 4a and col. 1, lines 51-57 and col. 3, lines 55-68).

Stettner does not disclose the crystal sheets and positional detectors arranged in a ring. *Tai* discloses scintillation crystal detection array forming one of a plurality of scintillation crystal detection arrays, each forming one of a plurality of modules (See Generally Fig. 1 and p. 1847, 2. Materials and methods). *Tai* teaches the increase in ring diameter accommodates for different subject sizes (p. 1847, 2. Materials and methods).

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Therefore, it would have been obvious to modify the apparatus suggested by Stettner to allow for forming a plurality of modules, as suggested by Tai, to allow for a more versatile apparatus.

Regarding claim 19, Tai discloses the modules arranged in a linear mosaic (p. 1848).

Regarding claim 20, Tai discloses the modules are arranged in a ring (See Generally Fig. 1 and p. 1847, 2. Materials and methods).

Regarding claim 21, Tai discloses the ring comprising one of a plurality of rings to form a cylinder, with leads from the scintillation crystal detection arrays extending from an outer circumference of the cylinder (See Generally Fig. 1 and p. 1847-1848)

6. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Stettner et al* (US 5,099,128 A) as applied to claim 22 above, and further in view of Seidel et al ("Experimental Estimates of the Absolute Sensitivity of a Small Animal PET Scanner with Depth-of-Interaction Capability", Nuclear Science Symposium Conference Record, IEEE).

Regarding claim 27, Stettner of a position sensitive high resolution stacked detector to identify nuclear material configurations (col. 1, lines 50-60). Stettner does not specifically disclose of providing x and y-axis positional. Seidel discloses semiconductor photodetector positional detectors being arranged to independently provide positional information relative to both an X and Y axis for interactions detected in the crystal sheets (See Generally Fig. 1 and p. 21-57). Seidel teaches the signals, from the scintillator-of-interaction technique, are sufficient to locate a scintillation event

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in any of the individual crystals in each sensor (p. (21-57)-(21-58)). Therefore, it would have been obvious to modify the apparatus suggested by Stettner to allow for both x and y axis positional information, as suggested by Seidel, to allow for a more versatile apparatus.

Allowable Subject Matter

7. Claims 3-5, 8-10 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

Regarding dependent claims 3, 5, 8 and 10, the prior art, as stated supra, does not disclose or fairly suggest of an intervening semiconductor photodetector positional detector comprising photodetector line arrays.

Regarding dependent claims 4, 9 and 24, the prior art, as stated supra, does not disclose or fairly suggest of an intervening semiconductor photodetector positional detector oriented to form a cross-grid arrangement of photodetector line arrays.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Faye Polyzos whose telephone number is 571-272-


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2447. The examiner can normally be reached on Monday thru Friday from 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

FP


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